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A Confirmatory Approach to Understanding the Four Factor Structure of the Adolescent Drinking Index: Evidence for a Brief Version

Lynn Hernandez, PhD,

Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, The Brown University School of Public Health, Providence, RI 02912

Christopher P. Salas-Wright, PhD,

School of Social Work, The University of Texas at Austin, Austin, TX 78712

Hannah Graves, BA,

Center for Alcohol and Addiction Studies, The Brown University School of Public Health, Providence, RI 02912

Mary Kathryn Cancilliere, MSW, and

Center for Alcohol and Addiction Studies, The Brown University School of Public Health, Providence, RI 02912

Anthony Spirito, PhD

Department of Psychiatry and Human Behavior, The Alpert Medical School of Brown University, Providence, RI 02912

Abstract

The purpose of this study was to examine the psychometric properties of the original version of the Adolescent Drinking Index (ADI), and to examine the fit of a series of confirmatory factor analysis models to arrive at an abbreviated version that can be easily administered in settings with limited time for assessment. These aims were examined in a sample of 740 adolescents ($M_{age} = 15.26$; 58.5% males) who completed the ADI during an Emergency Department visit. Results suggested that the four-domain design did not fit the data adequately. Results, however, demonstrated good fit for an 8-item adapted version with a four-factor structure: *interpersonal, social, psychological, and physical indicators*. This abbreviated version was also associated with outcomes such as hangover, alcohol withdrawal, and substance use. Findings from this study provide support for the use of an abbreviated version of the ADI for screening adolescents and referring them to appropriate interventions.

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Corresponding Author: Lynn Hernandez, PhD, Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, The Brown University School of Public Health, Box, GS-121-5, Providence, RI 02912, Phone: (401) 863-7688, Fax: (401) 863-6697, Lynn_Hernandez@Brown.edu.

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Keywords

Adolescent Drinking Index; confirmatory factor analysis; brief alcohol screening; emergency departments; adolescent drinking

1. Introduction

Adolescence is a developmental period marked by the onset and escalation of alcohol use. Adolescents typically consume their first whole drink during early adolescence and their levels of use escalate with increasing age (Faden, 2006). Nationally representative data of adolescents in the U.S. indicate that approximately 29.5% of adolescents in the 8th grade have experimented with alcohol and that these rates increase to 69.4% by the time adolescents reach the 12th grade (Johnston, O'Malley, Bachman, & Schulenberg, 2013). Data on levels of problematic drinking, from being drunk to binge drinking also demonstrate important age-related patterns. For example, 12.8% of 8th grade adolescents reported ever being drunk and 5.1% reported binge drinking (defined as 5 or more drinks on one occasion) in the past two weeks. By the time these adolescents reach the 12th grade, their rates of ever being drunk increase to 54.2% and their rates of binge drinking in the past two weeks increase to 23.7%. According to these data, alcohol use onset and escalation during adolescence is a developmentally normative behavior and may be related to specific developmental tasks (Masten, Faden, Zucker, & Spear, 2009). Data on developmental drinking trajectories have demonstrated that not all adolescents who drink are at the same level of risk for developing an alcohol-related disorder (Danielsson, Wennberg, Tengström, & Romelsjö, 2010; Jackson, Sher, & Schulenberg, 2005; Windle, Mun, & Windle, 2005). However, research has also demonstrated that the earlier a person initiates alcohol use, the greater their risk for developing alcohol-related disorders and DSM-IV diagnoses later in life (Flory, Lynam, Milich, Leukefeld, & Clayton, 2004; Hawkins et al., 1997; McGue, Iacono, Legrand, Malone, & Elkins, 2001).

There have been recent calls for screening, brief intervention, and referral for alcohol-related problems among adolescents as a form of scaffolding healthy developmental transitions (National Institute on Alcohol Abuse and Alcoholism, 2011; U.S. Department of Health and Human Services, 2007). However, with a demand for appropriate screening procedures comes a demand for appropriate screening tools. Given the heterogeneity in adolescents' drinking patterns, these screening tools need to go beyond drinking frequency and quantity and assess for problems associated with these drinking patterns. Further, these problems need to be assessed in a developmentally sensitive manner given that adolescent drinking occurs within the context of adolescent development and related transitions as well as has consequences on adolescent development. Finally, these instruments should be brief and easy to administer given the time constraints that exist in primary care settings, where screening procedures for adolescents are most likely to occur.

The Adolescent Drinking Index (ADI; Harrell & Wirtz, 1989) was created as an alcohol-screening tool that can be quickly and easily administered to adolescents. The ADI is based on a conceptual framework that defines problem drinking in terms of alcohol-related dysfunction across key domains of adolescent development (Harrell & Wirtz, 1989). These

domains include loss of control of drinking, social indicators reflecting difficulties in interpersonal relationships and role fulfillment as a result of drinking, psychological indicators reflecting drinking to cope with feelings such as loneliness and depression, and physical indicators reflecting memory problems and increased tolerance due to drinking. The ADI contains 24 self-report items assessing severity of drinking problems by measuring frequency of alcohol consumption across these four domains, problems associated with alcohol consumption, and the extent and intensity of problems in these domains. The ADI also includes two research subscales assessing for self-medicated drinking (MED) and aggressive and rebellious behaviors related to drinking (REB). These subscales were created to identify specific adolescent drinking patterns that can be addressed during intervention.

Harrell and Wirtz (1989) examined the ADI's reliability and validity across three independent samples of adolescents between the ages of 12–17 years. The first sample included 261 adolescents referred for evaluation of psychological, emotional, or behavioral problems. This sample yielded reliability coefficients of .87 for the MED subscale, .88 for the REB subscale, and .95 for the total ADI scale. The second sample included 583 adolescents recruited from schools, and yielded reliability coefficients of .80, .80, and .93, respectively. The third sample included 233 adolescents in treatment for substance abuse. This sample yielded reliability coefficients of .85 for the MED subscale, .88 for the REB subscale, and .94 for the total ADI scale. Further, the intercorrelations across these three samples ranged between .63 and .74 for the total ADI and MED subscale, .74 and .84 for the total ADI and REB subscale, and .53 and .63 for the MED and REB subscales. Further, Harrell and Wirtz (1989) assessed the utility of the ADI by comparing ADI results from a sample of 264 adolescents to ratings from clinicians with training in adolescent assessment across the four domains (e.g., loss of control, social and interpersonal, psychological, and physical indicators) of the ADI. Correlations on each of the four domains were between .75 to .79 ($p < .0001$), and all the domains showed significant positive correlations with the clinician severity rating, which ranged between .64 to .71 ($p < .0001$).

The ADI has been used in studies assessing alcohol severity across adolescent populations. However, most of these studies have used the ADI to categorize adolescents as having an alcohol-related problem by using its clinical cut-off score (> 16) or using a cumulative sum score rather than the original four factor framework examining dysfunction across adolescent developmental domains. For instance, in a study examining alcohol problem severity between depressed African-American and non-Hispanic white adolescents, Maag and Irvin (2005) found that non-Hispanic whites had overall significantly higher scores on the ADI than their African-American counterparts. They also found that older adolescents had a greater likelihood of having higher scores on the ADI (above the clinical cutoff, > 16) than younger adolescents. Further, Striegel-Moore and Huydic (1993) used the ADI to divide a sample of female high school students into two groups, problem drinkers (scores > 16) and non-problem drinkers (scores < 16), in order to examine associations between alcohol abuse and eating disorders. Adolescent girls with eating disorders were twice as likely to be problem drinkers than those who were not diagnosed with an eating disorder.

With the exception of the early studies conducted Harrell and Wirtz (1989), the ADI's four-domain conceptual framework has not been examined further. Therefore, the primary

objective of this study was to examine the ADI's original four-domain conceptual framework using confirmatory factor analysis (CFA) among a sample of adolescents. Further, in response to recent calls for the development and implementation of brief alcohol screening and assessment, our second objective was to seek evidence for an adapted version of the ADI that could be administered in settings with time constraints by conducting a series of confirmatory factor models. Our final objective was to compare the validity of the 24-item ADI with the adapted version of the ADI among a sample of adolescents with varying degrees of alcohol abuse risk.

2. Materials and methods

2.1. Participants

The sample consisted of 740 adolescents (433 males) between the ages of 13 and 17 years ($M = 15.26$, $SD = 1.3$) recruited between 1997 and 2008 to be part of one of three studies. Two of the studies recruited participants for clinical trials evaluating the efficacy of a brief individual motivational intervention for adolescents with an alcohol-related event that resulted in an ED visit (Spirito et al., 2004, Spirito et al., 2011). All participants in these two studies reported consuming alcohol within six hours of their ED admission; had a positive blood alcohol test or breathalyzer reading; and/or scored four or above on the Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 1992). Adolescents who were suicidal, were in police custody, or had serious injuries requiring hospitalization were not approached for participation in the study and those with incomplete recruitment, i.e., those participants whose consenting and/or screening for eligibility was interrupted by medical care and who then later declined to continue the enrollment process, were also excluded from this study. Incomplete recruitment occurred in 31 cases in the first study and 32 cases in the second study for a total of 63 cases.

The third study recruited adolescents treated in the ED for an injury or illness to serve as a comparison group on baseline characteristics to the adolescents in the two clinical trials described above. Data were collected during the time period of the first clinical trial described above. A score of four or above on the AUDIT was used to classify this last group as alcohol positive and a score of three or below was used to classify adolescents as alcohol negative (Fairlie, Sindelar, Eaton, & Spirito, 2006).

The majority of the sample identified as being White non-Hispanic (68.9%), 18.4% identified as being Hispanic, 7.0% identified as being Black/African American, and 5.7% identified as being part of another racial/ethnic group. Further, 476 adolescents were identified as being alcohol negative, while a total of 264 were identified as being alcohol positive.

2.2. Procedures

Adolescents recruited to be part of the two randomized clinical trials were referred to the studies by the ED or biochemistry lab staff, who were instructed to send an electronic page to research staff when an adolescent was identified in the ED either as having consumed any alcohol within six hours of their admission (in the case of ED staff) or as having tested positive (i.e., $BAC > 0.0$) for alcohol via medical staff-drawn blood test (in the case of the

biochemistry lab). All alcohol-positive participants were required to pass a brief mental status exam before completing the assessments. The mental status exam assessed temporal orientation, spatial orientation, memory, attention, and immediate and delayed recall. Adolescents were not approached until their BAC was less than 0.1% (g/ml) and/or they could pass the mental status exam. If participants were unable to complete the baseline assessment at the time of their ED visit, a follow-up visit was scheduled within a few days.

The data reported here were collected as part of the baseline adolescent assessments, which occurred before adolescents were randomized to either a control or experimental condition in the clinical trials. Adolescents in the third study were approached during their ED visit and asked if they wanted to participate in a comparison group for a study examining the characteristics of alcohol-positive adolescents being treated in an ED.

Written parental consent and adolescent assent were obtained for all families in the three studies. A Certificate of Confidentiality was obtained from the National Institutes of Health to further protect the confidentiality of the data collected. The overseeing university and hospital's Institutional Review Boards approved all study-related procedures.

2.3. Measures

Data reported here were collected as part of the baseline adolescent assessment.

Adolescent Drinking Index—As designed by Harrell and Wirtz (1989), the ADI is a 24-item self-report measure which focuses on social, psychological, and physical symptoms of alcohol problems across four domains. These domains include: 1) loss of control of drinking (4 items); b) social and interpersonal indicators (11 items); c) psychological motivations for alcohol use (7 items); and, d) physical indicators of alcohol use (2 items). Items relating to loss of control reflect frequency of binge drinking and intoxication, while items relating to social and interpersonal indicators reflect interpersonal conflict and behavioral problems related to alcohol use. Psychological indicators include alcohol use motives such as drinking for self-medicating purposes, and physical indicators of alcohol use reflect memory problems as well as increased tolerance. Ten items are rated on a three-point scale ranging from 0 (not like me at all) to 2 (like me a lot), and 14 items are rated on a 4-point scale ranging from 0 (never) to 3 (4 times or more).

Criterion related factors

Alcohol-related outcomes—Three alcohol-related variables were examined as criterion-related outcomes in this study: having experienced a hangover, having experienced sickness from alcohol withdrawal, and receipt of a positive alcohol screen by ED staff or the biochemistry lab. In terms of hangovers, adolescents who reported not experiencing a hangover in the past three months ($n = 448$, 60.54%) were coded as 0, while those who reported having recently experienced a hangover once ($n = 132$, 17.84%) were coded as 1, two or three times ($n = 103$, 13.92%) were coded as 2, and four or more times ($n = 57$, 7.70%) were coded as 3. As for withdrawal, adolescents who reported not having felt physically ill due to the absence of alcohol consumption in the past three months ($n = 720$,

97.30%) were coded as 0 while those having experienced such sickness one or more times were coded as 1 ($n = 20$, 2.70%).

Illicit substance use—Three additional variables were examined as criterion-related outcomes in the realm of the use of other illicit substances: cigarettes, cocaine, and other substances. Adolescents reported having used cigarettes ($n = 195$, 31.05%), cocaine ($n = 10$, 1.36%), or other substances ($n = 45$, 6.12%) in the last three months were coded as 1 while those who abstained from the use of these substances were coded as 0.

Sociodemographic controls—Demographic variables used in this study include: age, gender, race/ethnicity.

2.4. Data analytic strategy

For purposes of this study, the psychometric properties of the ADI were examined by means of several sequential steps. First, a confirmatory factor analysis (CFA) was performed to examine the validity of the four domain model put forth by Harrell and Wirtz (1989) using the 24-item ADI. Next, informed by results of factor and face validity analyses, a series of confirmatory factor models were examined in order to identify a psychometrically sound, multidimensional abbreviated version of the ADI. Specifically, we conducted factor analysis with the 24-items from the original ADI and identified four factors with Eigenvalues greater than 1.0. We then examined the face validity of ADI items with factor loading values greater than 0.40 and selected 14 items that were coherently related to other items within each factor. Using these items, we carried out a series of confirmatory factor analyses, systematically removing items with low factor coefficients and examining overall model fit before arriving at the 8-item, adapted ADI. Third, given that study participants include adolescents who received either a negative or positive alcohol screen, an examination of measurement invariance was conducted across these two alcohol use subgroups. Namely, the examination of invariance included a systematic comparison of factor patterns, tests of factor loading invariance, and the examination of goodness of fit statistics for adolescents screened as alcohol positive and alcohol negative. Finally, in order to compare the criterion-related validity of the 24-item ADI and the adapted ADI, Ordinary Least Squares (OLS) regression was used to examine the associations between the two versions of the ADI and alcohol-related/substance use outcomes. All statistical analyses were carried out using Stata 12.1 (StataCorp., 2011).

3. Results

3.1. Model fit of the 24-item ADI

A confirmatory factor analysis was executed to examine the psychometric properties of the 24-item ADI. Evaluation of goodness of fit relied upon the following indicators: the chi-square statistic, root mean squared error of approximation (RMSEA), comparative fit index (CFI), and the Tucker Lewis index (TLI). Schumaker and Lomax (2010) suggest that, although strongly influenced by sample size (Kline, 2010), the chi-square statistic should be nonsignificant ($p < .05$) or have a value that approximates the number of degrees of freedom. Tran (2009) suggests that the RMSEA value be at .05 or below and no greater

than .08, and that CFI and TLI values be greater than .90, with values closer to 1.00 indicating better model fit.

While the 24-item ADI was found to have good reliability as a unifactorial construct ($\alpha = .92$), results of the confirmatory factor analysis suggest that the Harrell and Wirtz (1989) four domain design was not an acceptable modeling of the data. As seen in Table 1, the goodness of fit statistics for the original 24-item model were not acceptable ($\chi^2 = 1710.85$ [246]; RMSEA = 0.90; CFI = .81; TLI = .79). Further, drawing from the modification indices, the specification of multiple correlated error terms improved the goodness of fit statistics but not to the degree that it could yield an acceptable fit for the 24-item model ($\chi^2 = 1077.28$ [229]; RMSEA = 0.071; CFI = .89; TLI = .87).

3.2. Model fit of the 8-item adapted ADI

Informed by results of descriptive, reliability, factor, and face validity analyses, a series of confirmatory factor models were examined in an effort to identify a psychometrically sound, abbreviated version of the ADI. Ultimately, an 8-item, four-factor abbreviated version of the ADI was identified. This multidimensional model included four distinct elements of adolescent alcohol use, including: in terpersonal indicators, social indicators, psychological indicators, and physical indicators of alcohol abuse. As seen in Table 1, all of the goodness of fit statistics for this 8-item model suggests acceptable fit ($\chi^2 = 39.86$ [14]; RMSEA = 0.05; CFI = .98; TLI = .97) without the specification of any correlated error terms. Additionally, as seen in Figure 1, all factor loading values, which ranged from 0.58 to 0.89 with a mean value of 0.71, loaded significantly onto their corresponding factors ($p < .001$). Reliability analysis also suggested that the eight items used in this version of the ADI have good internal consistency ($\alpha = 0.79$). Overall, the evidence suggests that the 8-item, abbreviated ADI has acceptable psychometric properties in this adolescent sample.

3.3. Invariance of 8-item ADI model

A systematic comparison of factor patterns, tests of factor loading invariance, and an examination of the goodness of fit statistics between the alcohol positive and alcohol negative subgroups was conducted in order to examine the measurement invariance of the 8-item ADI for these two distinct subgroups. As seen in Table 3, the factor pattern for these two subgroups was identical. Also, the Chi-Square tests of factor loading invariance for both the alcohol positive and alcohol negative subgroups were all found to be nonsignificant. This suggests that the factor loading values for each of the four factors in the adapted ADI were not significantly different among adolescents who screened positive for alcohol use in the ED versus those who did not. Additionally, while the goodness of fit statistics for the alcohol positive subgroup ($\chi^2 = 54.72$ [14]; RMSEA = 0.078; CFI = .97; TLI = .94) were slightly superior to those of the alcohol negative subgroup ($\chi^2 = 16.06$ [14]; RMSEA = 0.024; CFI = .99; TLI = .99), the goodness of fit statistics for these two subgroups were both acceptable and, by and large, similar. In sum, consistent with the two-part criteria of Jan-Benedict and Baumgartner (1998), these findings provide support for the psychometric validity of the 8-item ADI for both of the alcohol use subgroups examined in this study.

3.4. Criterion-Related Validity

OLS regression was conducted in order to examine the associations between the 8-item ADI and 24-item ADI with a variety of criterion-related outcomes. Controlling for various socio-demographic factors, the magnitude of the association between the 8-item ADI and alcohol use related outcomes such as hangover ($\beta = 0.17$, $p < .001$ versus 0.20 , $p < .001$), alcohol withdrawal ($\beta = 0.30$, $p < .001$ versus 0.27 , $p < .001$), and positive alcohol screen ($\beta = 0.21$, $p < .001$ versus 0.20 , $p < .001$) was consistently similar to that of the 24-item ADI. A comparable pattern of results was identified in terms of the associations between the 8-item and 24-item measures and the use of cigarettes and drugs: cigarettes ($\beta = 0.16$, $p < .001$ versus 0.18 , $p < .001$), cocaine ($\beta = 0.25$, $p < .001$ versus 0.28 , $p < .01$), other substances ($\beta = 0.25$, $p < .001$ versus 0.27 , $p < .001$). This pattern of significant and similar associations lends support to the criterion-related validity of both ADI measures, but also suggests that the sensitivity of the 8-item ADI is virtually identical to that of the 24-item ADI.

4. Discussion

The purpose of this study was to examine the four-domain conceptual framework postulated by Harrell and Wirtz (1989) and to determine if a shortened adapted version of the ADI could be identified for use in primary care settings where efficiency of assessment is a primary concern. By examining the psychometric properties of the model with the best fit, we were able to identify a parsimonious four-factor structure for an 8-item adapted version of the ADI that was similar to the original conceptual framework. In fact, results demonstrated a better fit for the 8-item adapted version than for the 24-item original ADI, thus indicating that the behaviors included in the adapted 8-item version are better at accounting for the variance. These results suggest that this set of eight questions capture the most important behaviors associated with adolescent risk for alcohol problems. Further, the fact that the associations between the 8-item ADI and the 24-item ADI were consistently similar on alcohol use related outcomes such as hangover, alcohol withdrawal, and positive alcohol screen, as well as the use of other substances, lends support to the criterion-related validity of both ADI measures. This finding suggests that the 8-item ADI and the 24-item ADI measure the same construct, despite their difference in number of items. Therefore, this brief, 8-item version of the ADI broadens the potential use of the ADI as an accurate screener for alcohol problems in primary care settings.

Our sample was drawn from an Emergency Department (ED), given that it was the site of three studies that collected data utilizing the ADI. While this may affect generalizability of our findings, it also allows us to examine the utility of the ADI among a sample of adolescents recruited from an ED, a potential setting for implementing screening procedures. EDs offer a unique opportunity to identify high-risk adolescents. For instance, in 2008, an estimated 188,981 alcohol-related ED visits were made by underage drinkers. Yet, only 19.1% of this group received follow-up care for alcohol use-related problems (Substance Abuse and Mental Health Services Administration: Center for Behavioral Health Statistics and Quality, 2011). A brief measure, such as this abbreviated version of the ADI, might improve the extent to which an adolescent's alcohol-related problems are identified in an ED and appropriate referral recommendations are made. Further, the fact that the factor loading

values for each of the four factors in the adapted ADI were not significantly different among adolescents who screened positive for alcohol use in the ED versus those who did not, suggests that this abbreviated version can be used with any adolescent that visits an ED, whether their visit is related to an alcohol-related event or not.

Although the results of this study are promising, a few limitations need to be considered. As mentioned earlier, the sample of adolescents was recruited from an ED. The sample was also largely comprised of white non-Hispanic adolescents (68.9%). Consequently, the current findings may not generalize to other samples of adolescents recruited from the community or from ethnically and racially diverse adolescent populations. Therefore, as is always the case when an abbreviated version of a measure is developed, it is crucial to test its applicability to other adolescent samples.

To summarize, the current study provided evidence for the use of an abbreviated, adapted version of the ADI. The use of this brief alcohol screener might provide an important stepping-stone for the successful identification, referral and treatment of adolescents at risk for developing alcohol-related problems. Therefore, the application of this psychometrically sound, 8-item ADI should be encouraged in settings where time generally does not allow for an extensive interview or assessment.

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Figure 1.

Confirmatory factor analysis for the 8-item, adapted Adolescent Drinking Index

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. χ^2 (df) = 39.86 (14)**; RMSEA = 0.050; CFI = 0.984; TLI = 0.967, $R^2 = 0.98$

Table 1

Goodness of fit statistics for first order CFA of the 24-item and 8-item ADI

Fit Indexes	24-Item, 4 Factor Model		8-Item, 4 Factor Model	
	Original	Correlated Error Terms	Original Model	Correlated Error Terms
χ^2 (df)	1710.85 (246)	1077.28 (229)	39.86 (14)	n/a
RMSEA	0.090	0.071	0.050	n/a
CFI	0.812	0.891	0.984	n/a
TLI	0.789	0.869	0.967	n/a
R^2	0.989	0.974	0.981	n/a

Coefficients in bold are statistically significant at $p < .05$ or lower.

Alpha coefficient for 8-item scale = .79. Alpha coefficient for 24-item scale = .92.

Table 2

Correlation matrix for the 8-item, adapted Adolescent Drinking Index

ADI Scale Items Retained	ADI 12	ADI 24	ADI 15	ADI 19	ADI 2	ADI 7	ADI 5	ADI 9
ADI 12: Friends/family were concerned about adolescent's drinking.	1.00							
ADI 24: Adolescent argued with parents because of his/her drinking.	0.65	1.00						
ADI 15: Frequency adolescent engaged in delinquent behaviors while drinking.	0.36	0.33	1.00					
ADI 19: Frequency adolescent got into a fight after drinking.	0.37	0.31	0.37	1.00				
ADI 2: Drinking due to feelings of anger or frustration.	0.40	0.33	0.29	0.31	1.00			
ADI 7: Drinking due to feelings of sadness.	0.24	0.20	0.18	0.20	0.54	1.00		
ADI 5: Adolescent developed tolerance.	0.45	0.35	0.39	0.31	0.32	0.25	1.00	
ADI 9: Adolescent was unable to recall things he/she said or did while drunk.	0.44	0.38	0.36	0.31	0.22	0.28	0.45	1.00

Item content but not exact wording are presented.

Table 3

Measurement model standardized estimates for a two-factor model

Scale Items	Negative Alcohol Screen (N = 476)				Positive Alcohol Screen (N = 264)				χ^2 Significance
	Interpersonal	Social	Psychological	Physical	Interpersonal	Social	Psychological	Physical	
ADI 12: Friends/family were concerned about adolescent's drinking.	0.95				0.84				0.31
ADI 24: Adolescent argued with parents because of his/her drinking.	0.76				0.66				--
ADI 15: Frequency adolescent engaged in delinquent behaviors while drinking.		0.68				0.62			0.14
ADI 19: Frequency adolescent got into a fight after drinking.		0.73				0.39			--
ADI 2: Drinking due to feelings of anger or frustration.			0.66				0.83		0.19
ADI 7: Drinking due to feelings of sadness.			0.82				0.62		--
ADI 5: Adolescent developed tolerance.				0.69				0.66	0.97
ADI 9: Adolescent was unable to recall things he/she said or did while drunk.				0.76				0.38	--

Note: Goodness-of-Fit for Alcohol Negatives: χ^2 (df) = 54.72 (14); RMSEA = 0.079; CFI = 0.968; TLI = 0.936

Goodness-of-Fit for Alcohol Positives: χ^2 (df) = 16.057 (14); RMSEA = 0.024; CFI = 0.994; TLI = 0.987

Table 4

Regression of the 8-item, adapted and the original 24-item ADI on sociodemographic factors and behavioral risk covariates

	8-item Adolescent Drinking Index	24-item Adolescent Drinking Index
	β (SE)	β (SE)
<i>Sociodemographic Factors</i>		
Age	0.02 (0.01) *	0.03 (0.01) **
Gender (1 = male)	0.03 (0.02)	0.02 (0.02)
Race/Ethnicity		
Hispanic	-0.05 (0.03)	
Other	-0.01 (0.03)	-0.01 (0.03)
<i>Alcohol-Related Outcomes</i>		
Hangover	0.17 (0.01) ***	0.20 (0.01) ***
Alcohol Withdrawal	0.30 (0.04) ***	0.27 (0.03) ***
Positive Alcohol Screen	0.21 (0.03) ***	0.20 (0.02) ***
<i>Illicit Substance Use</i>		
Cigarettes	0.16 (0.03) ***	0.18 (0.02) ***
Cocaine	0.25 (0.10) **	0.28 (0.09) **
Other Substances	0.25 (0.05) ***	0.27 (0.04) ***
R-Squared	0.596	0.702
Adjusted R-Squared	0.590	0.697

Note:

*
p < .05,

**
p < .01,

p < .001.